

REMARKS

Claims 1-26 are pending in this application.

Claims 1, 10, 13 and 22 are amended and claims 6, 7, 8, 9, 11, 12, 18, 19, 20, 21 and 23-26 are canceled by the present amendment.

Applicants request reconsideration of the pending claims in light of the above amendments and the following remarks.

Claim Rejection under 35 U.S.C. §103

Reconsideration is respectfully requested of the rejections of claims 1 and 4-26 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,846,745 to Papasouliotis et al. (hereinafter, Papasouliotis).

It is respectfully submitted that Papasouliotis does not disclose or suggest “**injecting first main process gases** including a silicon source gas, an oxygen gas, a nitrogen free chemical etching gas, (a helium gas: included in claim 13) and a hydrogen gas into the process chamber, **injecting second main process gases** into the process chamber after the injection of the first main process gases, wherein the second main process gases include a silicon source gas, an oxygen gas, a nitrogen free chemical etching gas, (helium gas: included in claim 1) and a hydrogen gas, and **injecting third main process gases** into the process chamber after the injection of the second main process gases, wherein the third main process gases include a silicon source gas, an oxygen gas and a hydrogen gas”, as essentially claimed in claims 1 and 13.

Examiner relies on Figs. 1A-1B and 2A-2B, col. 8, lines 44-60 of Papasouliotis to disclose “deposition to form a silicon layer is repeated a number of time in order to fill the gaps on a semiconductor substrate, wherein in each initial deposition and subsequent

deposition (e.g., first, second, third, fourth, etc.), the process gases include a silicon source gas, an oxygen gas, silicon tetrafluoride acted as a nitrogen free chemical etching gas, a hydrogen gas, and/or a helium gas.” (See., page 2 of Office Action). Applicants respectfully disagree.

Although Papasouliotis suggests repeated deposition operations, each step of the process does not disclose the use of the combination of gases as specified for the first, second and third main process gases. In contrast, the process gases disclosed by Papasouliotis in each step are only one or two gases opposed to the different number and types of gases of the first, second and third main process gases as claimed in the present application. For example, in a deposition step, Papasouliotis employs a fluorine-containing gas and H₂ (see, Papasouliotis at col. 3, line 67 - col. 4, line 2). In an etching step, Papasouliotis employs a fluorine-containing gas (see, Papasouliotis at col. 4, lines 55-60).

As such, Papasouliotis does not disclose or suggest “**injecting first main process gases** including a silicon source gas, an oxygen gas, a nitrogen free chemical etching gas, (a helium gas: included in claim 13) and a hydrogen gas into the process chamber, **injecting second main process gases** into the process chamber after the injection of the first main process gases, wherein the second main process gases include a silicon source gas, an oxygen gas, a nitrogen free chemical etching gas, (helium gas: included in claim 1) and a hydrogen gas, and **injecting third main process gases** into the process chamber after the injection of the second main process gases, wherein the third main process gases include a silicon source gas, an oxygen gas and a hydrogen gas”, as essentially claimed in claims 1 and 13.

Accordingly, claims 1 and 13 are not rendered obvious in view of Papasouliotis. Because claims 4, 5 and 10 depend from claim 1 and claims 14-17 and 22 depended from 13, these claims are also submitted to be patentably distinct over the cited reference.

Claims 2-3 were rejected under 35 U.S.C. §103(a) as being unpatentable over Papasouliotis taken with U.S. Patent No. 5,753,044 to Hanawa et al. (hereinafter, Hanawa).

Applicants submit that Papasouliotis taken with Hanawa does not render obvious claims 2 and 3 of the present invention.

As discussed above, Papasouliotis does not teach or suggest “**injecting first main process gases** including a silicon source gas, an oxygen gas, a nitrogen free chemical etching gas, (a helium gas: included in claim 13) and a hydrogen gas into the process chamber, **injecting second main process gases** into the process chamber after the injection of the first main process gases, wherein the second main process gases include a silicon source gas, an oxygen gas, a nitrogen free chemical etching gas, (helium gas: included in claim 1) and a hydrogen gas, and **injecting third main process gases** into the process chamber after the injection of the second main process gases, wherein the third main process gases include a silicon source gas, an oxygen gas and a hydrogen gas”, as essentially claimed in claim 1.

Hanawa, which is only directed to a plasma reactor, does not cure the deficiency of Papasouliotis with regard to first main process gases reacting with one another inside a chamber as in claim 1. Based on the above, independent claim 1 is patentable over Papasouliotis taken with Hanawa. Since claims 2-3 are dependent on claim 1, claims 2-3 are also patentable.


Accordingly, applicants respectfully request reconsideration and withdrawal of the rejection to claims 2-3 under 35 U.S.C. §103(a) as being unpatentable over Papasouliotis taken with Hanawa.

Conclusion:

In summary, applicants respectfully submit that the instant application is in condition for allowance. Early notice to that end is earnestly solicited.

If a telephone conference would be of assistance in furthering prosecution of the subject application, applicant requests that the undersigned be contacted at the number below.

Respectfully submitted,



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